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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,225	12/12/2005	Kinya Aota	500.45682X00	2697

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ANTONELLI, TERRY, STOUT & KRAUS, LLP  
1300 NORTH SEVENTEENTH STREET  
SUITE 1800  
ARLINGTON, VA 22209-3873

EXAMINER
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EDMONDSON, LYNNE RENEE

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 12/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/560,225

Applicant(s)

AOTA ET AL.

Examiner

Lynne Edmondson

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 September 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-18 and 23-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration. .
- 5) ☒ Claim(s) 10-12, 27 and 30 is/are allowed.
- 6) ☒ Claim(s) 1, 4-9, 13, 14, 17, 18, 24-26, 28 and 29 is/are rejected.
- 7) ☒ Claim(s) 2, 3, 15, 16 and 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 6, 7, 9, 14, 17, 25, 26, 28 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Showa (JPN 10-230376 A, IDS, machine translation).

Showa teaches a friction stir welding method for a lap joint wherein members are lapped and a stir welding tool is pressed into one of the members while being rotated. The tool is a conventional stir tool with a shoulder and small diameter portion used in a conventional process. The end of the small diameter portion is semispherical (figure 1). The member has a trapezoidal portion (figures 2, 4 and 5 and abstract). See translation paragraph 18 which teaches that the probe is inserted through the upper material (1) to near the front face of the lower material (2). There is no disclosure penetration into the lower material. Figure 1 shows the materials lapped. Translation paragraph 18 teaches activating the boundary surface by plastic flow and discharging member material which is placed behind the probe to fill the gap. The tip end as shown in figure 1 is semispherical. It is noted that the claim does not state that the entire tip or probe is

Art. Unit: 1725

semispherical. Translation paragraph 23 teaches that the materials may be different.

Figure 1 shows the trapezoidal joining area of member 1.

3. Claims 1, 7, 9, 17, 18 and 24-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Okamoto et al. (USPN 6843405 B2).

Okamoto teaches a friction stir welding method for a lap joint wherein dissimilar members are lapped and a stir welding tool is pressed into one of the members while being rotated. The tool is a conventional stir tool with a shoulder and small diameter portion used in a conventional process. A trapezoidal member is provided on a surface of one of the members which is seated in a groove of the second member (figures 7, 10 and 14). As shown in figures 1 and 3, the end of the small diameter portion may be plate or semispherical. Welding is performed by pressing the tool into an upper member only, causing that member to flow and bonding to a lower member with a groove. The members may be Al and Cu or Al and steel. The probe is tilted 5 degrees (figures 14, and col 5 lines 20-42 and col 4 lines 38-67).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 13, 14, 25 and 28 are rejected under 35 U.S.C. 103(a) as being obvious over Iwashita (US 2001/0038028 A1) in view of Nomura et al. (JPN 2002-66760A, machine translation).

Iwashita teaches a friction stir welding method for a lap joint wherein members of different quality (paragraph 5) are lapped face to face and a stir welding tool is pressed into one of the members while being rotated. As shown in figure 2, the probe does not completely penetrate the upper member (figures 2, 5, 6 and 12, paragraphs 32 and 38-40). Spot welds may be formed (paragraph 3). The tool is a conventional stir tool with a shoulder and small diameter portion used in a conventional process.

However there is no disclosure of different materials.

Nomura teaches a friction stir welding method for a lap joint wherein members are lapped and a stir welding tool is pressed into only one of the members while being rotated. The members are steel and aluminum (translation paragraph 51).

It would have been obvious to one of ordinary skill in the art at the time of the invention that the type of members joined does not substantially alter the process. The essential steps of the method would be the same for identical and dissimilar materials.

6. Claims 4, 5, 8, 13 and 24 are rejected under 35 U.S.C. 103(a) as being obvious over Showa (JPN 10-230376 A, IDS) in view of Thomas et al. (GB 2306366 A, IDS).

Showa teaches a friction stir welding method for a lap joint wherein members are lapped and a stir welding tool is pressed into one of the members while being rotated. The tool is a conventional stir tool with a shoulder and small diameter portion used in a conventional process. The small diameter portion is semispherical (figure 1). The member has a trapezoidal portion (figures 2, 4 and 5 and abstract). See translation paragraph 18 which teaches that the probe is inserted through the upper material (1) to near the front face of the lower material (2). There is no disclosure penetration into the lower material. Figure 1 shows the materials lapped. Translation paragraph 18 teaches activating the boundary surface by plastic flow and discharging member material which is placed behind the probe to fill the gap. The tip end as shown in figure 1 is semispherical. It is noted that the claim does not state that the entire tip or probe is semispherical. Translation paragraph 23 teaches that the materials may be different. Figure 1 shows the trapezoidal joining area of member 1.

However there is no disclosure of a tool with a rounded or inclined shoulder at the tip end, of tilting the tool at an angle or of spot welding.

Thomas teaches a friction stir welding method for a lap joint wherein members are lapped and a stir welding tool is pressed into one of the members while being rotated. The tool is a conventional stir tool with a shoulder and small diameter portion used in a conventional process (page 1 lines 1-21 and page 4 lines 1-14) in which the tool may be tilted (page 5 lines 23-34). The shoulder is rounded (figure 9C) with a

Art Unit: 1725

recess around the pin. The shoulder is inclined relative to the pin (figure 9A). The tip of the probe may be flat (figure 2D).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ conventional tools and methods which would include a tool with a rounded shoulder and moving the tool at an angle to provide a reliable bond without damaging the bonding members. Spot welding is an obvious variation of line welding. A welding tool with position control can either be traversed or inserted and removed. Although Thomas teaches an angle of 1-3 degrees rather than 5 degrees, it is presumed that the angle would be determined by the type, shape and thickness of the bonding member.

#### ***Allowable Subject Matter***

7. Claims 2, 3, 15, 16 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 10-12, 27 and 30 are allowed.

#### ***Response to Arguments***

9. Applicant's arguments with respect to claims 4, 5, 7-9 and 13 have been considered but are moot in view of the new ground(s) of rejection.

10. Regarding applicant's argument that Showa teaches away from penetration of only one member see translation paragraph 18 which teaches that the probe is inserted through the upper material (1) to near the front face of the lower material (2). There is no disclosure penetration into the lower material. Figure 1 shows the materials lapped. Translation paragraph 18 teaches activating the boundary surface by plastic flow and discharging member material which is placed behind the probe to fill the gap. The tip end as shown in figure 1 is semispherical. It is noted that the claim does not state that the entire tip or probe is semispherical or that it is a large diameter projection from the shoulder. Translation paragraph 23 teaches that the materials may be different. Figure 1 shows the trapezoidal joining area of member 1.

Therefore the 102 rejection of claims 1, 6, 14 and 17 as anticipated by Showa stands and now includes claims 7, 9 and new claims 25, 26, 28 and 29.

11. Regarding applicant's argument that Okamoto teaches away from penetration of only one member, see figures 4 and 14 and column 3 lines 50-54 which teach that the probe is inserted into the upper member but stops short of the lower member.

Regarding applicant's argument that this is a different technique using only mechanical joining which does not include a boundary surface activated and welded by plastic flow, the abstract teaches the method and a method of joining material by friction using plastic flow. See also col 4 lines 38-67 and figure 14 which teach the probe pressed into member 12 only and processing the materials such that member 12 flows. It is noted that in conventional friction stir welding the probe penetrates all lapped members.



Therefore the 102 rejection of claims 1, 17 and 18 as anticipated by Okamoto stands and now includes 7 and 9 and new claims 24-26.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kawasaki (JPN 2001-314982 A, IDS, spot welding, incline, round shoulder, lapped), Martin et al. (USPN 6045028, curve and coating), Miyanagi et al. (US 2003/0111514 A1, curve and coating), Nishiguchi et al. (EPN 1498210 A1, recess), Bolser (US 2005/0242158 A1, coating), Murakami (US 2005/0145678 A1, spot weld) and Trapp et al. (US 2006/0086775 A1).

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne Edmondson whose telephone number is (571) 272-1172. The examiner can normally be reached on Monday through Thursday from 7:00 a.m. to 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1725

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lynne Edmondson  
Primary Examiner  
Art Unit 1725

*LE*  
*12/18/00*

LRE